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ABSTRACT

This final report describes the activities of a 3-year project that investigated the effectiveness and efficiency of five stimulus control procedures for teaching individuals with severe disabilities in classroom and community-based settings. The research was conducted in public schools in the northern Illinois area and included the following five studies: (1) the effects of a fading procedure on the acquisition, transfer, and generalization of word identification; (2) the effects of multiple examples in teaching discriminations; (3) the effects of single component pretraining on the discrimination of stimuli with multiple cues; (4) the effects of dynamic presentations of instructional stimuli on the discrimination learning of students with severe disabilities; and (5) the effects of a minimally different, within trials sequence, and a maximally different, between trials sequence on the discrimination learning of persons with severe disabilities. The last study investigated the effects of a composite intervention of those variables found effective in the first five studies. Each study occurred in educational settings and measured the acquisition, maintenance, and generalization of a functional skill for 20 subjects with severe disabilities. The report includes a list of the project's activities, accomplishments, and research articles, presentations, and workshops, which were part of the dissemination efforts. (CR)

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Final Report
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Educational Research and Services Center
425 Fisk Avenue
DeKalb, Illinois 60115

November 1, 1988 - October 31, 1991

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Integrating Stimulus Presentation Procedures into Instruction for Persons with Severe Disabilities

Final Report

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ABSTRACT

The available instructional technology for teaching individuals with severe disabilities has been described as a conflicting, unsystematic collection of isolated procedures which are often poorly understood and poorly mastered by clinicians and teachers. Therefore, a major research challenge is to develop an effective and efficient instructional technology that is a) effective in complex and diverse environments and b) appropriate across many types of tasks. In recognition of this research need the purposes of this project were:

1. To determine the effectiveness and efficiency of five stimulus control procedures through a series of basic research investigations;
2. To demonstrate and evaluate the implementation of these procedures as teaching interventions in classroom and community settings; and
3. To disseminate the results of the basic research and clinical application through scholarly articles, teacher training materials, presentations, and workshops.

In order to achieve these purposes, six studies were conducted over a three-year period. Studies 1-5 investigated the independent effects of five stimulus control variables. Study 6 investigated the effects of a composite intervention of those variables found effective in Studies 1-5. The research was conducted in public schools in the northern Illinois area and results were disseminated through scholarly articles, presentations at national conferences, local workshops, and instruction in university teacher training programs.

GENERAL RESEARCH AND PURPOSE

An empirical data base is needed to validate an instructional technology that is both effective and efficient in improving educational outcomes for severely handicapped individuals. Thus far, instructional technology for severely handicapped persons has been comprised of an unsystematic collection of isolated stimulus control procedures. The clinical application of these procedures to teaching interventions has resulted in conflicting recommendations to teachers while student learning problems in acquisition, maintenance and generalization remain. In this project, we sought to clarify and refine five of these isolated procedures in classrooms and community settings in order to determine both their effectiveness and efficiency relative to standard educational practices. Those isolated procedures which were found to be both effective and efficient were incorporated into classroom and community-based instruction which was evaluated across diverse tasks and settings.

In order to determine systematically the effectiveness and efficiency of these five isolated stimulus control procedures, five individual research studies were conducted by project staff. Each study occurred in educational settings and measured the acquisition, maintenance, and generalization of a functional skill for 20 subjects. Following each study, the project staff demonstrated the use of the stimulus control procedure to teachers as a viable teaching intervention that is an integral part of a functional skills curriculum. The effectiveness of the clinical implementation of each stimulus control procedure was measured by student outcomes (i.e., acquisition, maintenance, and generalization) in both classroom and community settings. The efficiency of the clinical

implementation of each stimulus control procedure was measured by trials to criterion and time required for training. Finally, the results of each study and its clinical application were disseminated through scholarly articles, manuals, presentations, and workshops.

The five stimulus control factors relevant to improving the technology of teaching severely handicapped persons were: (1) fading, (2) multiple examples, (3) single component pretraining, (4) dynamic vs. static presentation, and (5) stimulus variation. Although there have been previous studies in each of these areas, the results have been equivocal. In addition, the procedures have not been tested in a fashion that demonstrates their application as teaching interventions. The purpose of this project was to test these procedures further so that they could be applied in classroom and community-based settings.

The five research studies of individual stimulus control factors were:

1. An Investigation of the Effects of a Fading Procedure on the Acquisition, Transfer, and Generalization of Word Identification;
2. The Effects of Multiple Examples in Teaching Discriminations;
3. The Effects of Single Component Pretraining on the Discrimination of Stimuli with Multiple Cues;
4. An Investigation of the Effects of Dynamic Presentations of Instructional Stimuli on the Discrimination Learning of Students with Severe Disabilities; and

5. The Effects of a Minimally - Different Within Trials, Maximally - Different Between Trials Sequence on the Discrimination Learning of Persons with Severe Disabilities.

In Year 3, the procedures examined in Studies 1-5 were integrated into daily classroom and community - based instruction (Study 6) in order to more fully evaluate the effect of these procedures on student outcomes (i.e., acquisition, generalization, and maintenance).

PLAN OF OPERATION

Management Plan

The six research studies and the writing of dissemination materials were conducted over a three-year period, and in this section, we will describe the activities for each of these years. In general, the first two years were spent determining the effectiveness and efficiency of the individual variables identified in Studies 1-5. Portions of the manual relating to the results of Studies 1-5 were written. In Year 3, Study 6 examined the instructional method which was based on the results of Studies 1-5.

YEAR 1 ACTIVITIES

1. Research Study 1.

A. Area	Activities
a. Writing subject descriptions	a. Visit research sites (these are already determined) and from the subject's records, write subject descriptions.
b. Writing definitions of variables	b. Write variables specific to acquisition, maintenance and generalization of skills.

c. Writing scripted instructional procedures	c. Scripts will be written for implementation of the independent variable so that reliability can be assured.
d. Preparing stimulus materials	d. Materials will be developed that meet the established criteria and are deemed adequate by three judges.
e. Training teachers in implementation of the independent variable	e. A model-lead-test procedure will be used by the research staff.
f. Establishing reliability of the independent variable	f. Using the Epson HX-20 (a portable microcomputer programmed by Repp, Harmon, and Felce, 1984) observation will continue until 100 percent fidelity to the independent variable is met.
g. Develop observation system	g. Undergo the author's training program in observational skills (Repp, et al., 1983), a program requiring about 20 hours of training.
h. Establish reliability	h. Using the Epson HX-20 (a portable microcomputer programmed by Repp, Harmon, & Felce, 1984), record responses until kappa scores greater than 0.80 are achieved for each variable.
i. Conduct research	i. Under daily supervision, observers will collect data.
j. Analyze data	j. Data will be analyzed according to computer programs we write.
k. Write report	k. Writing report for this grant.
B. Dissemination	
a. Publication	a. Writing manuscript for publication.
b. Presentations	b. Presenting at conferences such as AAMD or the Gatlinburg Research Conference.

b. Sending information to Advisory Council, NIA, those on our mailing list, etc.

c. Workshops

c. Present workshops to staff in the facilities with severely handicapped students showing how to use the results of our studies.

d. Write dissemination manual

d. Writing the portion of the dissemination manual that corresponds to Study 1.

2. Research Study 2

A. Area

a. Writing subject descriptions

a. Visit research sites (these are already determined) and from the subject's records, write subject descriptions.

b. Writing definitions of variables

b. Write variables specific to acquisition, maintenance, and generalization of skills that will be taught.

c. Writing scripted instructional procedures

c. Scripts will be written for implementation of the independent variable so that reliability can be assured.

d. Preparing stimulus materials

d. Materials will be developed that meet the established criteria and are deemed adequate by three judges.

e. Training teachers in implementation of the independent variable

e. A model-lead test procedure will be used by the research staff.

f. Establishing reliability of the independent variable

f. Using the Epson HX-20 (a portable microcomputer programmed by Repp, Harmon, & Felce, 1984), observation will continue until 100 percent fidelity to the independent variable is met.

g. Develop observation system

g. Undergo the author's training program in observational skills (Repp, et al., 1983), a program requiring about 20 hours of training.

h. Establish reliability of dependent variables	h. Using the Epson HX-20 (a portable microcomputer programmed by Repp, Harmon, & Felce, 1984), record responses until kappa scores greater than 0.80 are achieved for each variable.
i. Conduct research	i. Under daily supervision teachers will implement the intervention and observers will collect data.
j. Analyze data	j. Data will be analyzed according to computer programs we write.
k. Write report	k. Writing report for this grant.

B. Dissemination

1. Study 2

a. Publication	a. Writing manuscript for publication.
b. Presentation	b. Presenting at conferences such as AAMD or the Gatlinburg Research Conference. b. Sending information to Advisory Council, NIA, those on our mailing list, etc.
c. Workshops	c. Present workshops to staff at facilities with severely handicapped students showing how to use the results of our studies.
d. Write dissemination manual	d. Writing the portion of the dissemination manual that corresponds to Study 2.

Year 2 Activities

As the research plans of operation for Studies 3, 4 and 5 were similar to those in Studies 1 and with the exception that a different research area was addressed, the activities for those investigations were conducted in the same way as specified in Studies 1-2.

Year 3 Activities

1. Research Study 6

A. Area

a. Selecting community, vocational, and education settings	a. Visit research sites (they are already determined) and select ecologically valid settings for implementation.
b. Writing subject description	b. Visit research sites and from the subjects' records write subject descriptions.
c. Writing definitions of variables	c. Write variables specific to acquisition, maintenance and generalization of skills.
d. Writing scripted instructional procedures	d. Scripts will be written that incorporate the results of Studies 1-5 into a comprehensive instructional method.
e. Training teachers in implementation of the independent variable	e. A model-lead-test procedure will be used by the research staff.
f. Establishing reliability of the independent variable	f. Using the Epson HX-20 (a portable microcomputer programmed by Repp, Harmon, & Felce, 1984) observation will continue until 100 percent fidelity to the independent variable is met.
g. Establishing reliability of the dependent variable	g. Using the Epson HX-20, record responses until kappa scores greater than 0.80 are achieved for each dependent variable.
h. Conducting research	h. Under daily supervision, the teachers will implement the method of instruction and the observers will collect data.
i. Analyze data	i. Data will be analyzed according to computer programs we write.
j. Writing report	j. Report for this grant will be written.

B. Dissemination

a. Writing	a. Writing manuscript for publication.
b. Presentations	b. Presenting at conferences such as AAMD or the Gatlinburg Research Conference. b. Sending information to Advisory Council, NIA, those on our mailing lists, etc.
c. Conducting workshops	c. Present workshops to staff at research site facilities showing how to use the results of our studies.
d. Writing dissemination manual	d. Writing the portion of the dissemination manual that corresponds to Study 6.

ACCOMPLISHMENTS

In this section the significant accomplishments during the three years of the project are presented. Specific accomplishments are sequenced in the same order as the goals and objectives of the PLAN OF OPERATION so that a direct comparison can be made.

Following the sequence of specific accomplishments a detailed listing of the research articles, presentations, and workshops which were part of the dissemination efforts is presented.

Research Study 1

Objectives	Date Achieved
A. Area	
a. Writing subject descriptions	12/1/1988
b. Writing definitions of variables	12/16/88
c. Writing scripted instructional procedures	12/16/88
d. Preparing stimulus material	12/23/88
e. Training experimenters in implementation of the independent variable	12/16/88
f. Establishing reliability of the independent variable	12/23/88
g. Develop data-collection system	12/23/88
h. Established reliability	1/13/89
i. Conduct research	3/31/89

	Date Achieved
j. Analyze data	4/7/89
k. Write report	5/9/89
B. Dissemination	
a. Publication	4/28/89
b. Presentations	
c. Workshops	3/31/89
d. Write dissemination manual	9/1/89

Research Study 2

Objectives	Date Achieved
A. Area	
a. Writing subject descriptions	4/7/89
b. Writing definitions of variables	4/21/89
c. Writing scripted instructional procedures	4/21/89
d. Preparing stimulus material	4/28/89
e. Training experimenters in implementation of the independent variable	4/21/89
f. Establishing reliability of the independent variable	4/28/89
g. Develop data-collection system	4/28/89
h. Established reliability	4/28/89
i. Conduct research	6/9/89
j. Analyze data	6/16/89
k. Write report	7/15/89
B. Dissemination	

a. Publication	4/28/89
b. Presentations	
c. Workshops	3/31/89
d. Write dissemination manual	9/1/89

Research Study 3

Objectives	Date Achieved
A. Area	
a. Write subject descriptions	12/15/1989
b. Write definitions of variables	12/17/89
c. Write scripted instructional procedures	12/18/89
d. Prepare stimulus material	12/28/89
e. Train experimenters in implementation of the independent variable	12-29-89
f. Establish reliability of the independent variable	12/29/89
g. Develop data-collection system	12/28/89
h. Established reliability	1/10/90
i. Conduct research	3/1/90
j. Analyze data	3/10/90
k. Write report	4/10/90
B. Dissemination	
a. Publication	5/20/90
b. Presentations	4/20/90
c. Workshops	3/10/90
d. Write dissemination manual	9/1/90

Research Study 4	Date Achieved
Objectives	
A. Area	
a. Write subject description	8/15/90
b. Write definitions of variables	8/17/90
c. Write scripted instructional procedures	8/20/90
d. Prepare stimulus material	8/28/90
e. Train experimenters in in implementation of the independent variable	8/29/90
f. Establish reliability of the independent variable	8/29/90
g. Develop data-collection system	8/28/90
h. Establish reliability	9/3/90
i. Conduct research	10/15/90
j. Analyze data	10/22/90
k. Write report	10/31/90
B. Dissemination	
a. Publication	11/1/90
b. Presentations	
c. Workshops	
d. Write dissemination manual	11/1/90

Research Study 5	Date Achieved
Objectives	
A. Area	
a. Write subject descriptions	8/15/90
b. Write definitions of variables	8/17/90
c. Write scripted instructional procedures	8/20/90
d. Prepare stimulus material	8/28/90
e. Train experimenters in implementation of the independent variable	8/29/90
f. Establish reliability of the independent variable	8/29/90
g. Develop data-collection system	8/28/90
h. Establish reliability	9/3/90
i. Conduct research	10/15/90
j. Analyze data	10/22/90
k. Write report	10/31/90
B. Dissemination	
a. Publication	11/1/90
b. Presentations	
c. Workshops	10/15/90
d. Write dissemination manual	11/1/90

Research Study 6	Date Achieved
Objectives	
A. Area	
a. Write subject descriptions	11/10/90
b. Write definitions of variables	11/12/90
c. Write scripted instructional procedures	11/20/90
d. Prepare stimulus material	11/25/91
e. Train teachers in implementation of the independent variable	1/15/91
f. Establish reliability of the independent variable	1/30/91
g. Develop data-collection system	11/25/90
h. Establish reliability	1/30/91
i. Conduct research	6/15/91
j. Analyze data	7/30/91
k. Write report	8/31/91

Dissemination of Project Results	
Objectives	
A. Area	
a. Publication	11/1/91
b. Presentations	11/1/91
c. Workshops	11/1/91
d. Write dissemination manual	11/1/91

The following is a detailed listing of presentations, scholarly articles and workshops which were part of the dissemination activities for this project.

Presentations

Karsh, K. G., & Repp, A. C. (1991). An instructional strategy for teaching functional skill discriminations and increasing student engagement. Paper presented at the annual meeting of the Association for Persons with Severe Handicaps, Washington, D.C.

Karsh, K. G., Repp, A. C., & Dahlquist, C. M. (1991). A comparison of static and dynamic presentation of instructional materials. Paper presented at the annual meeting of the Association for Persons with Severe Handicaps, Washington, D. C.

Repp, A. C., Karsh, K. G., O'Brien, S., & Toles, L. (1991). A comparison of two procedures for presenting positive and negative examples. Paper presented at the annual meeting of the Association for Persons with Severe Handicaps, Washington, D. C.

Repp, A. C., Karsh, K. G., & O'Brien, S. (1991). Effects of changing critical and noncritical features on discrimination learning of persons with developmental disabilities. Paper presented at the annual meeting of the Association for Behavior Analysis, Atlanta, GA.

Repp, A. C., Karsh, K. G., & O'Brien, S. (1991). Teaching word identification to students with and without prerequisite letter recognition skills: A comparison of successive-single, additive-single and multiple component training. Paper presented at the annual meeting of the Association for Behavior Analysis, Atlanta, GA.

Publications

Karsh, K. G., Repp, A. C. & Dahlquist, C. M. (1991). A comparison of static and dynamic presentations of instructional materials on discrimination learning of individuals with moderate retardation. Manuscript submitted for publication.

Repp, A. C., & Karsh, K. G. (1991). A comprehensive instructional strategy for teaching functional discriminations to individuals with severe disabilities. Manuscript in preparation.

Repp, A. C., Karsh, K. G., & O'Brien, S. (1991). The effects of single component and additive component pretraining on the discrimination of stimuli with multiple cues. Manuscript submitted for publication.

Repp, A. C., Karsh, K. G., & O'Brien, S. (1991). The effects of stimulus examples in teaching discriminations to individuals with severe disabilities. Manuscript submitted for publication.

Workshops and Staff Development

Northwest Association for Special Education Organization, Palatine, IL.

School Association for Special Education of DuPage, Naperville, IL.

Mid-Valley Special Education Cooperative, St. Charles, IL.

Elgin Community Unit School District, Elgin, IL.